Attachment 1:
Tables

Table 1: Summary of Water Quality Data
Monitoring Wells
Railroad Avenue Groundwater Contamination Site

Well	Analyte	MCL* (ug/L)	Concentration					Units
			1999-00	Jan. 04	May-June 05	Oct. 05	Apr-May 06	
MW-1	cDCE	70	--	NS	NS	NS	NS	ug/L
MW-1	tDCE	100	--	NS	NS	NS	NS	ug/L
MW-1	PCE	5	--	NS	NS	NS	NS	ug/L
MW-1	TCE	5	1.3	NS	NS	NS	NS	ug/L
MW-1	VC	2	--	NS	NS	NS	NS	ug/L
MW-1	Xylenes	10000	--	NS	NS	NS	NS	ug/L
MW-2	cDCE	70	--	<1	NS	<1	<1	ug/L
MW-2	tDCE	100	--	<1	NS	<1	<1	ug/L
MW-2	PCE	5	--	<1	NS	<1	<1	ug/L
MW-2	TCE	5	3	**8.89**	NS	3.6	**10.4**	ug/L
MW-2	VC	2	--	<1	NS	<1	<1	ug/L
MW-2	Xylenes	10000	--	<3	NS	<3	<3	ug/L
MW-3	cDCE	70	--	<1	NS	<1	18.4	ug/L
MW-3	tDCE	100	--	<1	NS	<1	<1	ug/L
MW-3	PCE	5	--	<1	NS	<1	<1	ug/L
MW-3	TCE	5	2.71	2.89	NS	<1	**95.1**	ug/L
MW-3	VC	2	--	<1	NS	<1	<1	ug/L
MW-3	Xylenes	10000	--	<3	NS	<3	<3	ug/L
MW-4	cDCE	70	--	33.3	NS	24.8	15.7	ug/L
MW-4	tDCE	100	--	1.8	NS	1.9	1.31	ug/L
MW-4	PCE	5	--	**7.86**	NS	3.9	1.88	ug/L
MW-4	TCE	5	**127**	**194**	NS	**146**	**66.1**	ug/L
MW-4	VC	2	--	<1	NS	<1	<1	ug/L
MW-4	Xylenes	10000	--	<3	NS	<3	<3	ug/L
MW-5	cDCE	70	--	2.2	NS	3.61	<1	ug/L
MW-5	tDCE	100	--	<1	NS	<1	<1	ug/L
MW-5	PCE	5	--	<1	NS	<1	<1	ug/L
MW-5	TCE	5	**33.8**	**14.2**	NS	**22.8**	3.03	ug/L
MW-5	VC	2	--	<1	NS	<1	<1	ug/L
MW-5	Xylenes	10000	--	<3	NS	<3	<3	ug/L
MW-6	cDCE	70	--	<1	NS	<1	<1	ug/L
MW-6	tDCE	100	--	<1	NS	<1	<1	ug/L
MW-6	PCE	5	--	<1	NS	<1	<1	ug/L
MW-6	TCE	5	<1	**14.5**	NS	**63.2**	**72.8**	ug/L
MW-6	VC	2	--	<1	NS	<1	<1	ug/L
MW-6	Xylenes	10000	--	<3	NS	<3	<3	ug/L

Table 1 (cont): Summary of Water Quality Data
Monitoring Wells
Railroad Avenue Groundwater Contamination Site

Well	Analyte	MCL* (ug/L)	Concentration					Units
			1999-00	Jan. 04	May-June 05	Oct. 05	Apr-May 06	
MW-7	cDCE	70	--	1.42	--	<1	8.22	ug/L
MW-7	tDCE	100	--	<1	--	<1	<1	ug/L
MW-7	PCE	5	--	**6.74**	3.0	<1	4.63	ug/L
MW-7	TCE	5	**11.7**	**21.4**	**16**	**10.9**	**81.4**	ug/L
MW-7	VC	2	--	<1	--	<1	<1	ug/L
MW-7	Xylenes	10000	--	<3	--	<3	<3	ug/L
MW-8	cDCE	70	NI	16.5	--	13	<1	ug/L
MW-8	tDCE	100	NI	<1	--	<1	<1	ug/L
MW-8	PCE	5	NI	**7.89**	**7**	**15.8**	<1	ug/L
MW-8	TCE	5	NI	**101**	**49**	**107**	2.89	ug/L
MW-8	VC	2	NI	<1	--	<1	<1	ug/L
MW-8	Xylenes	10000	NI	--	--	<3	<3	ug/L
MW-9	cDCE	70	NI	1.48	NS	<1	<1	ug/L
MW-9	tDCE	100	NI	<1	NS	<1	<1	ug/L
MW-9	PCE	5	NI	1.9	NS	<1	<1	ug/L
MW-9	TCE	5	NI	**22.9**	NS	1.55	**8.67**	ug/L
MW-9	VC	2	NI	<1	NS	<1	<1	ug/L
MW-9	Xylenes	10000	NI	<3	NS	<3	<3	ug/L
MW-10	cDCE	70	NI	<1	NS	<1	<1	ug/L
MW-10	tDCE	100	NI	<1	NS	<1	<1	ug/L
MW-10	PCE	5	NI	<1	NS	<1	<1	ug/L
MW-10	TCE	5	NI	1.79	NS	<1	1.99	ug/L
MW-10	VC	2	NI	<1	NS	<1	<1	ug/L
MW-10	Xylenes	10000	NI	--	NS	<3	<3	ug/L
MW-11	cDCE	70	NI	<1	NS	<1	<1	ug/L
MW-11	tDCE	100	NI	<1	NS	<1	<1	ug/L
MW-11	PCE	5	NI	<1	NS	<1	<1	ug/L
MW-11	TCE	5	NI	1.35	NS	**7.88**	**6.16**	ug/L
MW-11	VC	2	NI	<1	NS	<1	<1	ug/L
MW-11	Xylenes	10000	NI	<3	NS	<3	<3	ug/L
MW-12	cDCE	70	NI	<1	NS	<1	<1	ug/L
MW-12	tDCE	100	NI	<1	NS	<1	<1	ug/L
MW-12	PCE	5	NI	<1	NS	<1	<1	ug/L
MW-12	TCE	5	NI	1.98	NS	<1	1.92	ug/L
MW-12	VC	2	NI	<1	NS	<1	<1	ug/L
MW-12	Xylenes	10000	NI	--	NS	<3	<3	ug/L

Table 1 (cont): Summary of Water Quality Data
Monitoring Wells
Railroad Avenue Groundwater Contamination Site

Well	Analyte	MCL* (ug/L)	Concentration					
			1999-00	Jan. 04	May-June 05	Oct. 05	Apr-May 06	Units
MW-13	cDCE	70	NI	<1	NS	<1	<1	ug/L
MW-13	tDCE	100	NI	<1	NS	<1	<1	ug/L
MW-13	PCE	5	NI	<1	NS	<1	1.08	ug/L
MW-13	TCE	5	NI	2.75	NS	3.69	**9.21**	ug/L
MW-13	VC	2	NI	<1	NS	<1	<1	ug/L
MW-13	Xylenes	10000	NI	<3	NS	<3	<3	ug/L
MW-14	cDCE	70	NI	NI	--	1.10	NS	ug/L
MW-14	tDCE	100	NI	NI	--	<1	NS	ug/L
MW-14	PCE	5	NI	NI	**7**	**5.18**	NS	ug/L
MW-14	TCE	5	NI	NI	**47**	**52.9**	NS	ug/L
MW-14	VC	2	NI	NI	--	<1	NS	ug/L
MW-14	Xylenes	10000	NI	NI	--	<3	NS	ug/L
MW-15	cDCE	70	NI	NI	--	NS	NS	ug/L
MW-15	tDCE	100	NI	NI	--	NS	NS	ug/L
MW-15	PCE	5	NI	NI	**9**	NS	NS	ug/L
MW-15	TCE	5	NI	NI	**15**	NS	NS	ug/L
MW-15	VC	2	NI	NI	--	NS	NS	ug/L
MW-15	Xylenes	10000	NI	NI	--	NS	NS	ug/L
MW-16	cDCE	70	NI	NI	--	<1	5.16	ug/L
MW-16	tDCE	100	NI	NI	--	<1	<1	ug/L
MW-16	PCE	5	NI	NI	1	<1	2.62	ug/L
MW-16	TCE	5	NI	NI	**28**	**29.6**	**50.9**	ug/L
MW-16	VC	2	NI	NI	--	<1	<1	ug/L
MW-16	Xylenes	10000	NI	NI	--	<3	<3	ug/L
MW-17	cDCE	70	NI	NI	--	13.6	<1	ug/L
MW-17	tDCE	100	NI	NI	--	<1	<1	ug/L
MW-17	PCE	5	NI	NI	1	<1	<1	ug/L
MW-17	TCE	5	NI	NI	**82**	**105**	2.45	ug/L
MW-17	VC	2	NI	NI	--	<1	<1	ug/L
MW-17	Xylenes	10000	NI	NI	--	<3	<3	ug/L
MW-18	cDCE	70	NI	NI	--	<1	<1	ug/L
MW-18	tDCE	100	NI	NI	--	<1	<1	ug/L
MW-18	PCE	5	NI	NI	ND	<1	<1	ug/L
MW-18	TCE	5	NI	NI	**22**	**19.5**	**19.5**	ug/L
MW-18	VC	2	NI	NI	--	<1	<1	ug/L
MW-18	Xylenes	10000	NI	NI	--	<3	<3	ug/L

Table 1 (cont): Summary of Water Quality Data
WDMWs
Railroad Avenue Groundwater Contamination Site

Well	Analyte	MCL* (ug/L)	Concentration									Units
			Jul. 02	Nov. 02	May 03	Nov. 03	Nov. 04	Feb. 05	May-June 05	Oct. 05	Apr-May 06	
WDMW-19	TCE	5	1	1.4	1.5	1.4	0.95	1.0 U	1.0 U	1.0 U	1.0 U	ug/L
WDMW-19	cDCE	70	0.5 U	0.5 U	0.5 U	1.0 U	0.5 U	1.0 U	1.0 U	1.0 U	1.0 U	ug/L
WDMW-19	tDCE	100	NS	--	NS	NS	NS	NS	NS	NS	<1	ug/L
WDMW-19	VC	2	0.5 U	0.5 U	0.5 U	2.0 U	0.5 U	1.0 U	1.0 U	1.0 U	1.0 U	ug/L
WDMW-19	Xylenes	10000	NS	<0.5	NS	NS	NS	NS	NS	NS	<0.5	ug/L
WDMW-21	TCE	5	1.4	1.9	1.8 (1.8)	2.4	0.5 U	2.1 (2.0)	3.1	3.1	3	ug/L
WDMW-21	cDCE	70	0.96	0.66	1.7 (1.7)	3.1	2.6	1.8 (1.8) U	1.0 U	1.0 U	1.0 U	ug/L
WDMW-21	tDCE	100	NS	--	NS	NS	NS	NS	NS	NS	<1	ug/L
WDMW-21	VC	2	0.5 U	0.5 U	0.5 (0.5) U	2.0 U	5.1	1.0 U	1.0 U	1.0 U	1.0 U	ug/L
WDMW-21	Xylenes	10000	NS	3.7	NS	1.5	NS	NS	NS	NS	<3	ug/L

* MCLs established under 40 CFR 141.
Bolded results indicate contaminant detected above MCL.
Duplicate result in parentheses.
Another VOC detected infrequently at low concentrations includes chloroethane at 2.9 ug/L in well WDMW-19 in November 2003.

ug/L = Micrograms per liter.
NA = Not available.
ND= Not detected by gas chromatography method.
NI = Well not yet installed.
NS = Not sampled.
U = Not detected at or above the reportable level shown.
"--" Analytical results were not provided.

Table 2
Medium-Specific Exposure Point Concentration Summary
Railroad Avenue Groundwater Contamination Site

Scenario Timeframe:	Current
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Point	Chemical of Concern	Units	Arithmetic Mean (1)	95% UCL (Distribution)	Maximum Concentration	Exposure Point Concentration (2)		
						Value	Units	Statistic
Aquifer 1 Tap Water WDMW*	Trichloroethene	ug/L	N/A	N/A	1.4	1.4	ug/L	Max
	bis(2-Ethylhexyl)phthalate	ug/L	N/A	N/A	27	27	ug/L	Max
	Manganese	ug/L	266	N/A	664	266	ug/L	Arithmetic Mean

1 Arithmetic mean was not calculated due to only one detection for each chemical.
2 The wells used in determining the exposure point concentrations were WDMW18, WDMW05, WDMW15, WDMW16, WDMW17, WDMW14, WDMW19, WDMW20.
* WDMW - West Des Moines Municipal Supply Wells
Max - Maximum Detected Concentration.
ug/L - Micrograms per liter.
N/A - Not Applicable.

Table 3
Medium-Specific Exposure Point Concentration Summary
Railroad Avenue Groundwater Contamination Site

Scenario Timeframe:	Current
Medium:	Groundwater
Exposure Medium:	Air

Exposure Point	Chemical of Concern	Units	Arithmetic Mean (1)	95% UCL (Distribution)	Maximum Concentration	Exposure Point Concentration (2)		
						Value	Units	Statistic
Water Vapors from Showerhead WDMW*	Trichloroethene	ug/L	N/A	N/A	1.4	1.4	ug/L	Max
	bis(2-Ethylhexyl)phthalate	ug/L	N/A	N/A	27	27	ug/L	Max

1 Arithmetic mean was not calculated due to only one detection for each chemical.
2 The wells used in determining the exposure point concentrations were WDMW18, WDMW05, WDMW15, WDMW16, WDMW17, WDMW14, WDMW19, WDMW20.
* WDMW - West Des Moines Municipal Supply Wells
Max - Maximum Detected Concentration.
ug/L - Micrograms per liter.
N/A - Not Applicable.

Table 4
Medium-Specific Exposure Point Concentration Summary
Railroad Avenue Groundwater Contamination Site

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Aquifer 1Tap Water

Chemical of Concern	Arithmetic Mean (1)	95% UCL (Distribution)	Maximum Concentration	Units	Exposure Point Concentration (2)		
					Value	Units	Statistic
PCE	N/A	N/A	0.00786	mg/L	0.00786	mg/L	Max
TCE	N/A	N/A	0.194	mg/L	0.194	mg/L	Max
cDCE	N/A	N/A	0.0333	mg/L	0.0333	mg/L	Max
tDCE	N/A	N/A	0.0018	mg/L	0.0018	mg/L	Max

1 Arithmetic mean was not calculated due to only one detection for each chemical.
2 The well used in determining the exposure point concentrations was Southern Plume MW-4.
MW - Monitoring Well
Max - Maximum Detected Concentration.
mg/L - Milligrams per liter.
N/A - Not Applicable.

Table 5
Selection of Exposure Pathways
Railroad Avenue Groundwater Contamination Site

Scenario Time-frame	Medium	Exposure			Receptor		Onsite or Offsite	Anal-ysis Type	Rationale for Selection or Exclusion of Exposure Pathway
		Medium	Point	Route	Type	Age			
Current/ Future	Soil	Surface soil	Onsite	Dermal	Industrial Worker	Adult	Onsite	Qual	Workers may be exposed to soil across the site.
				Ingestion			Onsite	Qual	
				Dermal	Resident	Adult	Onsite	Qual	Current and future adult residents may be exposed to contaminants in on-site soil.
				Ingestion			Onsite	Qual	
				Dermal		Child	Onsite	Qual	Current and future child residents may be exposed to contaminants in on-site soil.
				Ingestion			Onsite	Qual	
		Subsurface soil	Onsite	Dermal		Adult	Onsite	Qual	Current and future adult resident may be exposed to contaminants in subsurface soil brought to the surface during construction activities.
				Ingestion			Onsite	Qual	
				Dermal		Child	Onsite	Qual	Current and future child resident may be exposed to contaminants in subsurface soil brought to the surface during construction activities.
				Ingestion			Onsite	Qual	
		Air	Onsite	Inhalation	Industrial Worker	Adult	Onsite	Qual	Workers possibly exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions.
				Inhalation	Resident	Adult	Onsite	Qual	Adults possibly exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions.
				Inhalation		Child	Onsite	Qual	Children possibly exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions.

Table 5 (cont)
Selection of Exposure Pathways
Railroad Avenue Groundwater Contamination Site

Scenario Time-frame	Medium	Exposure			Receptor		Onsite or Offsite	Anal-ysis Type	Rationale for Selection or Exclusion of Exposure Pathway
		Medium	Point	Route	Type	Age			
Current	Ground-water	Air	Water Vapors at Shower-head	Inhalation	Resident	Adult	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells.
		Ground-water	Tap Water	Dermal	Resident	Adult	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells.
				Dermal		Child	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells.
				Dermal	Industrial Worker	Adult	Onsite	None	Workers currently obtain water from the West Des Moines Municipal Supply Wells.
				Ingestion	Resident	Adult	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells.
				Ingestion		Child	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells.
				Ingestion	Industrial Worker	Adult	Onsite	Quant	Workers currently obtain water from the West Des Moines Municipal Supply Wells.
Future	Ground-water	Ground-water	Tap Water	Ingestion	Resident	Adult	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells and may obtain water from offline wells and other monitoring wells in the future.
				Ingestion		Child	Onsite	Quant	Residents currently obtain water from the West Des Moines Municipal Supply Wells and may obtain water from offline wells and other monitoring wells in the future.
				Ingestion	Industrial Worker	Adult	Onsite	Quant	Workers currently obtain water from the West Des Moines Municipal Supply Wells and may obtain water from offline wells and other monitoring wells in the future.

Table 6
Non-Cancer Toxicity Data Used for Current Risk Calculations -- Oral/Dermal
Railroad Avenue Groundwater Contamination Site

Chemical of Potential Concern	Chronic / Sub-chronic	Oral RfD		Oral Absorption Efficiency - Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty / Modifying Factors	RfD Target Organ(s)	
		Value	Units		Value	Units			Source	Date
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2 Dichloroethene	Chronic	1.E-02	mg/kg-day	100%	1.E-02	mg/kg-day	Blood	3000	HEAST	7/1/97
Tetrachloroethene	Chronic	1.E-02	mg/kg-day	100%	1.E-02	mg/kg-day	Liver	1000	IRIS	3/11/03
Trichloroethene	Chronic	3.E-04	mg/kg-day	100%	3.E-04	mg/kg-day	Liver/Kidney /Fetus	3000	NCEA	3/11/03
Vinyl Chloride	Chronic	3.E-03	mg/kg-day	100%	3.E-03	mg/kg-day	Liver Cell Polymorphum	30	IRIS	3/11/03
Arsenic	Chronic	3.E-04	mg/kg-day	95%	2.9.E-04	mg/kg-day	Skin	3	IRIS	3/11/03
bis(2-Ethylhexyl) phthalate	Chronic	2.E-02	mg/kg-day	55%	1.E-02	mg/kg-day	Liver	1000	IRIS	3/11/03
bis(2-Ethylhexyl) phthalate	Sub-chronic	2.E-02	mg/kg-day	55%	1.E-02	mg/kg-day	Liver	1000	HEAST	7/1/97
Manganese (water)	Chronic	2.E-02	mg/kg-day	20%	4.E-03	mg/kg-day	Central Nervous system	1	IRIS	3/11/03

HEAST - Health Effects Assessment Summary Tables
IRIS - Integrated Risk Information System
kg - Kilogram.
mg - Milligrams.
N/A - Not Applicable
NCEA - National Center for Environmental Assessment

(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for dermal risk Assessment) Interim. Section 4.2 and Exhibit 4-1.
(2) See Risk Assessment text for the derivation of the "Absorbed RfD for Dermal."

Table 7
Non-Cancer Toxicity Data Used for Current Risk Calculations -- Inhalation
Railroad Avenue Groundwater Contamination Site

Chemical of Potential Concern	Chronic / Sub-chronic	Value Inhalation		Adjusted Inhalation RfD (1)		Primary Target Organ(s)	Combined Uncertainty / Modifying Factors	RfD Target Organ(s)	
		Value	Units	Value	Units			Source	Date
1,2-Dibromo-3-Chloropropane	Chronic	2.4E-04	mg/m3	5.7E-05	mg/kg/day	Testicular	1000	IRIS	03/11/2003
cis-1,2 Dichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	Chronic	4.0E-01	mg/m3	1.7E-01	mg/kg/day	Liver/Kidney	300	NCEA	06/20/1977
Trichloroethene	Chronic	4.0E-02	mg/m3	1.1E-02	mg/kg/day	CNS/Liver/ Endocrine	1000	NCEA	8/1/2001
Vinyl Chloride	Chronic	1.0E-01	mg/m3	2.8E-02	mg/kg/day	Liver Cell Polymorphism	30	IRIS	03/11/2003
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese (water)	Chronic	5.0E-05	mg/m3	1.40E-05	mg/kg-day	Central Nervous System	1000	IRIS	03/11/2003

IRIS - Integrated Risk Information System
kg - Kilogram.
m - Meter.
mg - Milligrams.
N/A - Not Applicable
NCEA - National Center for Environmental Assessment
(1) See Risk Assessment text for the derivation of the "Extrapolated RfD."

Table 8
Cancer Toxicity Data Used for Current Risk Calculations -- Oral/Dermal
Railroad Avenue Groundwater Contamination Site

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	Evidence / Cancer Guideline Description	Source	Date (2)
1,2-Dibromo-3-Chloropropane	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,2 Dichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	5.2E-02	100%	5.2E-02	(mg/kg-day)-1	B2	NCEA	12/01/01
Trichloroethene	2.0E-02 to 4.0E-01	100%	2.0E-02 to 4.0E-01	(mg/kg-day)-1	B2	NCEA	08/01/01
Trichloroethene	6.0E-03	100%	6.0E-03	(mg/kg-day)-1	B2	NCEA	1965
Vinyl Chloride	1.4E+00*/ 7.2E-01**	100%	1.4E+00*/ 7.2E-01**	(mg/kg-day)-1	A	IRIS	03/11/03
Arsenic	1.5E+00	95%	1.6E+00	(mg/kg-day)-1	A	IRIS	03/11/03
bis(2-Ethylhexyl)phthalate	1.4E-02	55%	2.5E-02	(mg/kg-day)-1	B2	IRIS	03/11/03
Manganese (water)	N/A	4%	N/A	N/A	N/A	N/A	N/A

kg - Kilogram.
IRIS = Integrated Risk Information System.
mg - Milligrams.
N/A = Not Available.
NCEA = National Center for Environmental Assessment.
(1) RAGs Subpart A (1989); RAGs Subpart E (2001); see explanation in text.
(2) For IRIS, last revision date as provided in IRIS.
* Lifetime exposure from birth (child).
** Lifetime exposure during adulthood (adult).
EPA Group:
A - Human carcinogen
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.

Table 9
Cancer Toxicity Data Used for Current Risk Calculations -- Inhalation
Railroad Avenue Groundwater Contamination Site

Chemical of Potential Concern	Unit Risk	Units	Adjust-ment (1)	Inhalation Cancer Slope Factor	Units	Evidence / Cancer Guideline Description	Source	Date (2)
1,2-Dibromo-3-Chloropropane	N/A	N/A	N/A	A	IRIS	N/A	N/A	N/A
cis-1,2 Dichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	3.1E-06	(ug/m3)-1	3500	1.0E-02	(mg/kg-day)-1	B2	NCEA	12/21/01
Trichloroethene	1.1E-04	(ug/m3)-1	3500	2.0E-02 to 4.0E-01	(mg/kg-day)-1	B2	NCEA	08/01/01
Trichloroethene	1.1E-04	(ug/m3)-1	3500	6.0E-03	(mg/kg-day)-1	B2	NCEA	1987
Vinyl Chloride	8.8E-06*/ 4.4E-06**	(ug/m3)-1	3500	3.1E-02*/ 1.5E-02**	(mg/kg-day)-1	C	NCEA	08/01/01
Arsenic	4.3E-03	(ug/m3)-1	3500	1.5E+01	(mg/kg-day)-1	A	IRIS	03/11/03
bis(2-Ethylhexyl)phthalate	4.2E-06	(ug/m3)-1	3500	1.4E-02	(mg/kg-day)-1	B2	NCEA	09/20/95
Manganese (water)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

IRIS = Integrated Risk Information System.
kg - Kilogram.
m - Meter.
ug - Micrograms.
mg - Milligrams.
N/A = Not Available.
NCEA = National Center for Environmental Assessment.

(1) Explanation of derivation provided in text.
(2) For IRIS, last revision date as provided in IRIS.

* Lifetime exposure from birth (child).
** Lifetime exposure during adulthood (adult).

EPA Group:
A - Human carcinogen.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.

Table 10
Calculation of Chemical Cancer Risks and Non-Specific Hazards – Data Used for Future Risk Calculations
Railroad Avenue Groundwater Contamination Site

Receptor	Chemical	Concentration* (mg/L)	Cancer Exposure (mg/kg-day)	Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Cancer Risk	Noncancer Exposure (mg/kg-day)	Reference Dose** (mg/kg-day)	Hazard Index
Adult	PCE	0.00786	7.4×10^{-5}	0.052	4×10^{-6}	2.2×10^{-4}	0.01	0.02
	TCE	0.194	0.0018	0.02 to 0.4	4×10^{-5} to 7×10^{-4}	0.0053	0.0003	18
	cDCE	0.0333	NA	NA	NA	9.2×10^{-4}	0.01	0.09
	tDCE	0.0018	NA	NA	NA	5.0×10^{-5}	0.02	0.002
Child	PCE	0.00786	4.3×10^{-5}	0.052	2×10^{-6}	5.0×10^{-4}	0.01	0.05
	TCE	0.194	0.0011	0.02 to 0.4	2×10^{-5} to 4×10^{-4}	0.012	0.0003	41
	cDCE	0.0333	NA	NA	NA	0.0021	0.01	0.2
	tDCE	0.0018	NA	NA	NA	1.2×10^{-4}	0.02	0.006
Industrial Worker	PCE	0.00786	2.7×10^{-5}	0.052	1×10^{-6}	7.7×10^{-5}	0.01	0.008
	TCE	0.194	6.8×10^{-4}	0.02 to 0.4	1×10^{-5} to 3×10^{-4}	0.0019	0.0003	6
	cDCE	0.0333	NA	NA	NA	3.3×10^{-4}	0.01	0.03
	tDCE	0.0018	NA	NA	NA	1.8×10^{-5}	0.02	0.0009

*Maximum Concentration in Southern Plume Monitoring Well 4
**tDCE Primary Target Organ is the blood.
kg - Kilogram.
L - Liter.
mg - Milligrams.

Slope factor and reference dose information was obtained from the U.S. EPA's Integrated Risk Information System (IRIS) in May 2004.

Table 11
Cumulative Cancer Risk and Hazard Indices for Each Population Evaluated
Railroad Avenue Groundwater Contamination Site

Timeframe	Receptor Population	Carcinogenic Risks	Chemical of Potential Concern	Hazard Index	Chemical of Potential Concern
Current	Adult Resident	6E-06 to 2E-05*	Bis(2-ethylhexyl)phthalate and TCE	0.5	Manganese, TCE
	Child Resident			1	Manganese, TCE
	Industrial Worker	1E-06 to 3E-06	Bis(2-ethylhexyl)phthalate, and TCE	0.2	Manganese
Future	Adult Resident	7E-05 to 1E-03*	TCE	18	TCE
	Child Resident		TCE	41	TCE
	Industrial Worker	1E-05 to 3E-04	TCE	6	TCE

* The cancer risk results for the child and adult were combined to obtain an excess cancer risk for a resident (EPA, 1989a).

Table 12
Risk Summary
Railroad Avenue Groundwater Contamination Site

Scenario Timeframe: Future

Receptor Population / Age	Resident / Child	Resident / Adult	Industrial Worker / Adult
Medium	Groundwater	Groundwater	Groundwater
Exposure Medium	Groundwater	Groundwater	Groundwater
Exposure Point	Aquifer 1 - Tap Water MW-4	Aquifer 1 - Tap Water MW-4	Aquifer 1 - Tap Water MW-4
Chemical of Potential Concern	TCE	TCE	TCE
Carcinogenic Risk			
Ingestion	2×10^{-5} to 4×10^{-4}	4×10^{-5} to 7×10^{-4}	1×10^{-5} to 3×10^{-4}
Inhalation			
Dermal			
External (Radiation)			
Exposure Routes Total	2×10^{-5} to 4×10^{-4}	4×10^{-5} to 7×10^{-4}	1×10^{-5} to 3×10^{-4}
Total Risk Across All Media	2×10^{-5} to 4×10^{-4}	4×10^{-5} to 7×10^{-4}	1×10^{-5} to 3×10^{-4}
Non-Carcinogenic Hazard Quotient			
Primary Target Organ	Liver/Kidney/Fetus	Liver/Kidney/Fetus	Liver/Kidney/Fetus
Ingestion	41	18	6
Inhalation			
Dermal			
Exposure Routes Total	41	18	6
Total Hazards Across All Media	41	18	6

Table 13
Detailed Screening of Remedial Action
Railroad Avenue Groundwater Contamination Site

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Monitored Natural Attenuation	Alternative 3 Focused Pump and Treat
Overall Protection	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. No public education or institutional controls to prevent exposure to groundwater contamination. RAO would not be satisfied.	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. Public education and institutional controls would be used to prevent exposure to groundwater contamination. RAO would be satisfied.	Relies on pump and treat, natural attenuation processes, and interim response actions to reduce chlorinated solvent concentrations over time. Public education and institutional controls would be used to prevent exposure to groundwater contamination. However, this alternative generates spent carbon wastes, which must be transported offsite for reactivation/reuse, or disposal; the waste may be classified as hazardous based upon its use. RAO would be satisfied.
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)	Through natural attenuation and interim response actions the chemical specific ARARs should be satisfied. Location- and action-specific ARARs are not applicable.	Through natural attenuation and interim response actions the chemical specific ARARs should be satisfied. Location- and action-specific ARARs are not applicable.	Complies with chemical specific ARARs. Action-specific ARARs would apply including wastewater discharge and waste disposal (for spent activated carbon) regulations. Must comply with substantive (non-administrative) requirements for on-site cleanup activities and both substantive and administrative requirements for off-site cleanup activities.
Long-Term Effectiveness	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. No public education or institutional controls to prevent exposure to groundwater contamination. No monitoring to confirm long term effectiveness.	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. Public education and institutional controls would be used to prevent exposure to groundwater contamination. Monitoring would be able to confirm contaminate concentrations and prove long-term effectiveness. Estimated time to achieve cleanup criteria is 20 years.	Uses a proven and reliable remedial technology in the concentrated portion of the source area. Public education and institutional controls would be used to prevent exposure to groundwater contamination. Routine monitoring would be conducted during (and after) operation of the pump and treat system to demonstrate the long-term effectiveness and permanence. Estimates time to achieve cleanup criteria is 15 years.
Reduction of Toxicity, Mobility, and Volume	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. No monitoring to confirm reduction of toxicity, mobility, and volume.	Relies on natural attenuation processes and interim response actions to achieve and maintain cleanup criteria. Monitoring would be able to confirm contaminate concentrations and prove reduction of toxicity, mobility, and volume.	The pump and treat system would be designed to contain and treat the area of highest chlorinated solvent detections at this facility. Monitoring would be able to confirm contaminate concentrations and prove reduction of toxicity, mobility, and volume.
Short-Term Effectiveness	Because no remedial actions would be conducted, there would be no increase in the short-term risks to the community or the environment. No public education or institutional controls to prevent exposure to groundwater contamination.	Because no remedial actions would be conducted, there would be no increase in the short-term risks to the community or the environment. Public education and institutional controls would be used to prevent exposure to groundwater contamination.	An increased risk to workers and the community would exist while installing the pump and treat system. A Health & Safety Plan (HASP) would be required to ensure worker safety during well and treatment system construction and O&M activities. Public education and institutional controls would be used to prevent exposure to groundwater contamination.

Table 13 (cont)
Medium-Specific Exposure Point Concentration Summary
Railroad Avenue Groundwater Contamination Site

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Monitored Natural Attenuation	Alternative 3 Focused Pump and Treat
Implementability	Because no remedial actions would be conducted, an evaluation of remedial implementability is not applicable.	Readily implementable subject to submittal and approval of an application for an environmental protection easement, and the long term monitoring plan. Implementation requires no procurement or mobilization of equipment, material, or subcontractors. Site fencing already in place. Overall implementation duration is estimated as 4-6 weeks.	Most difficult to implement because it requires detailed design, equipment selection/procurement, construction plans and specifications, utility connections, contractor selection/mobilization; also subject to approval of environmental protection easement, permits, and the long term monitoring plan. Overall design and implementation duration is estimated as 8-9 months.
Cost (Total Present Worth)	$0	$506,000	$2,422,000
State Acceptance	Since RAO is not met it is unlikely that the support agency would accept this alternative.	Support agency acceptance is probable because it monitors the contamination, controls the risk of exposure, and is capable of achieving the RAO.	Support agency acceptance is probable because it is a proven remedial technology, monitors the contamination, controls the risk of exposure, and is capable of achieving the RAO.
Community Acceptance	Since RAO is not met it is unlikely that the community would accept this alternative.	Community acceptance is probable because this alternative offers the least restrictions with regard to site use for future occupants/owners, controls site risks, and reduces contamination over time.	Likely to be readily acceptable to the community for the same reasons as support agency acceptance. However, the lengthy durations of construction and O&M, and placement of remediation wells/equipment could restrict future land use/redevelopment.

Table 14
Cost Estimations for Implementation of Institutional Controls and Monitoring
Railroad Avenue Groundwater Contamination Site

Cost Item	Notes	Unit	Quantity	$/Unit	$ a/
CAPITAL					
Direct Costs	b/				
1. Initial/Baseline Monitoring		ls	1	10,500	$10,500
Subtotal Direct Costs					$10,500
Indirect Costs	c/				
2. Engineering/Project Management		ls	1	20%	$2,100
3. Permitting/Institutional Controls		ls	1	6,500	$6,500
4. Contingency		ls	1	10%	$1,100
Subtotal Indirect Costs					$9,700
TOTAL CAPITAL COST	d/				$20,200
Annual O&M	e/				
1. Monitoring		ea	2	10,500	$21,000
2. Reporting		ls	1	6,000	$6,000
3. Project Management		mth	12	1,800	$21,600
4. Contingency		ls	1	10%	$4,900
TOTAL ANNUAL O&M COST	f/				$53,500
Present Worth of Annual O&M - 20 Years @ 5% (P/A for 20yr = 12.4622)					$666,700
TOTAL PRESENT WORTH OF ALTERNATIVE	g/				$686,900

Notes and Assumptions:

a/ All dollar amounts are rounded to the nearest hundred, in August 2004 dollars.

b/ Direct costs include:
- Baseline water quality monitoring assumes sampling total of 15 wells, VOC analyses, field parameters.

c/ Engineering/project management = 20% of direct capital cost. IC fees are estimated based on experience.
Contingency allowance = 10% of direct capital.

d/ Total capital cost equals sum of direct and indirect costs.

e/ System O&M assumes 20 years monitoring/reporting/project mgmt only:
- Monitoring assumes semi-annual sampling and analyses of VOCs at 15 wells, plus water levels, field readings.
- Annual reporting of system performance/data and monitoring results.
- Labor/project management assumes 0.4 days/week.
- Contingency allowance = 10% of annual O&M costs.

f/ Present worth of O&M assumes 20 yrs monitoring/reporting only, at 5% net discount rate.

g/ Total present worth = sum of total capital cost and present worth of 20 yrs monitoring only.

Table 15
Summary of Cost Revisions to the FS by IDNR 7/12/2006
Alternative 2: Monitored Natural Attenuation
Railroad Avenue Groundwater Contamination Site

	Estimate Costs	Source
Total Capital Cost	$20,000	FS Table 5.
Annual O&M Cost	$36,000	7/10/06 Conversation with Bridget Morrello, Progressive
Annual O&M Cost Present Worth	$486,000	Annual cost with 5% interest over 23 years.
Total Present Worth	$506,000	Capital Costs + Annual O&M Present Worth.

Table 16
Other Costs Associated with the Selected Final Remedy
Railroad Avenue Groundwater Contamination Site

Cost Item	$/Unit Estimate	Unit	Cost Estimates	Notes
Annual O&M for Air Sparging Wells	---	---	---	---
Electricity	$1,600	monthly	$19,200	Source is Removal Site Evaluation Memorandum - Addendum Table 7.
Labor - O&M	$1,500	monthly	$18,000	
Materials - O&M	$300	monthly	$3,600	
Equipment Replacement	$1,200	sum	$1,200	
Total Annual O&M for Air Sparging Wells	---	Annual	**$42,000**	---
5 Year Reviews	---	Every 5 Years	**$50,500**	Source is 2005 Railroad Avenue ROD Table 13.
Public Education	---	Every 5 Years	**$4,000**	Source is 2005 Railroad Avenue ROD Table 13. Includes preparation of documents, publication in newspaper, and fact sheet mailings.
Decommissioning/ Closure of Source Area Remedy	---	---	---	---
Air Sparge Well Abandonment	$500	30	$15,000	Source is Opinion of Probable Costs for Decommissioning/ Closure of Source Area Remedy. All dollar amounts are rounded to the nearest hundred, in August 2004 dollars.
Monitoring Well Abandonment	$650	18	$11,700	
Air Sparge Piping/Equipment Decommissioning	$3,000	lump sum	$3,000	
Building/Pad Demolition	$4,500	sum	$4,500	
Disposal (C&D landfill)	$2,000	sum	$2,000	
Site Restoration	$1,000	sum	$1,000	
Engineering/Project Management	10%	lump sum	$3,700	
Total Decommissioning/ Closure of Source Area Remedy	---	---	**$40,900**	

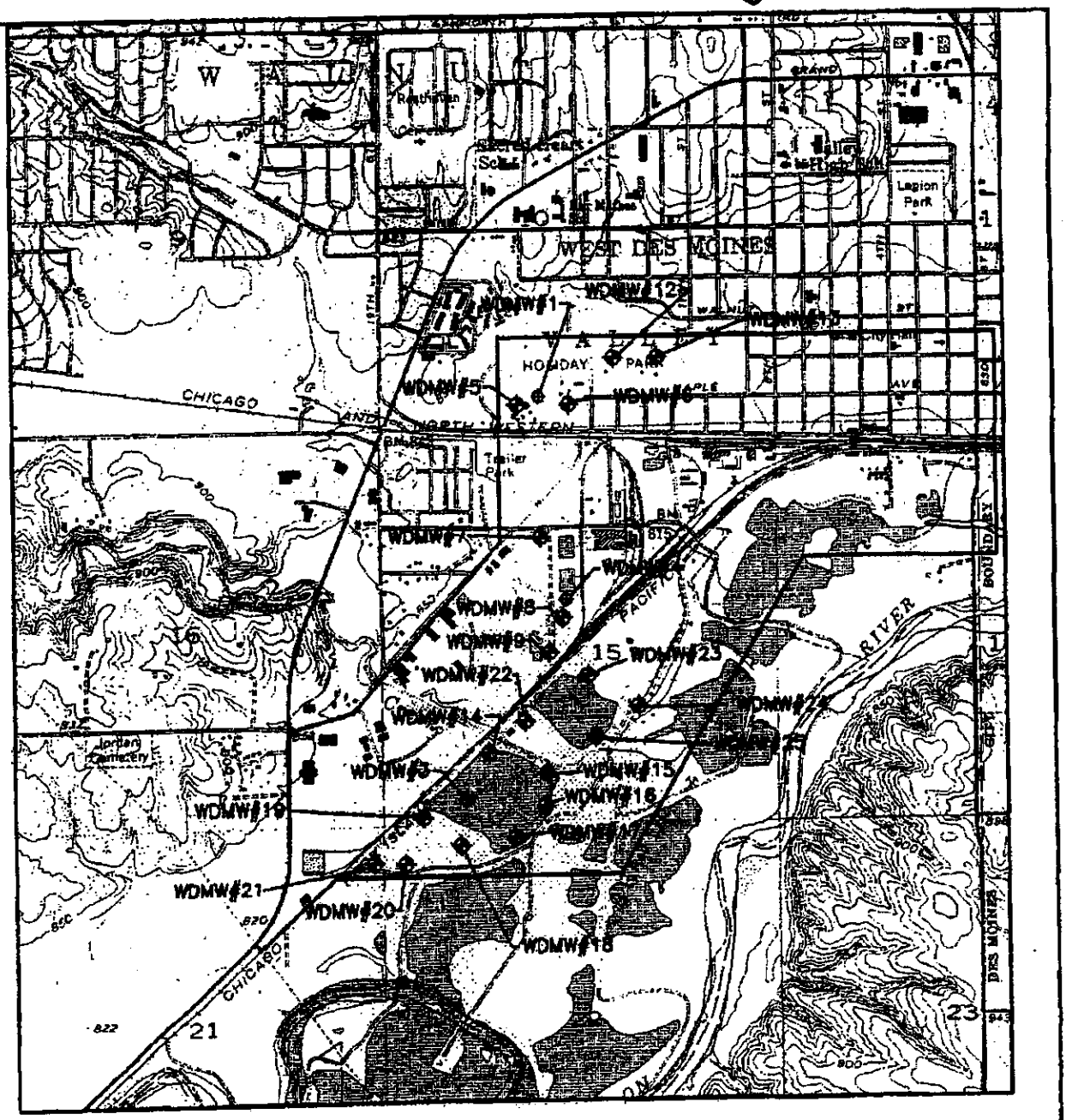
Table 17
Final Cleanup Levels
Railroad Avenue Groundwater Contamination Site

Contaminant	Final Groundwater Cleanup Levels[1]	Basis for Cleanup Level[2]
PCE	5 µg/L	Federal MCL
TCE	5 µg/L	Federal MCL
cDCE	70 µg/L	Federal MCL
tDCE	100 µg/L	Federal MCL

Notes
[1] µg/L - micrograms per liter
[2] 40 CFR Part 141

Attachment 2: Figures

Figure 1



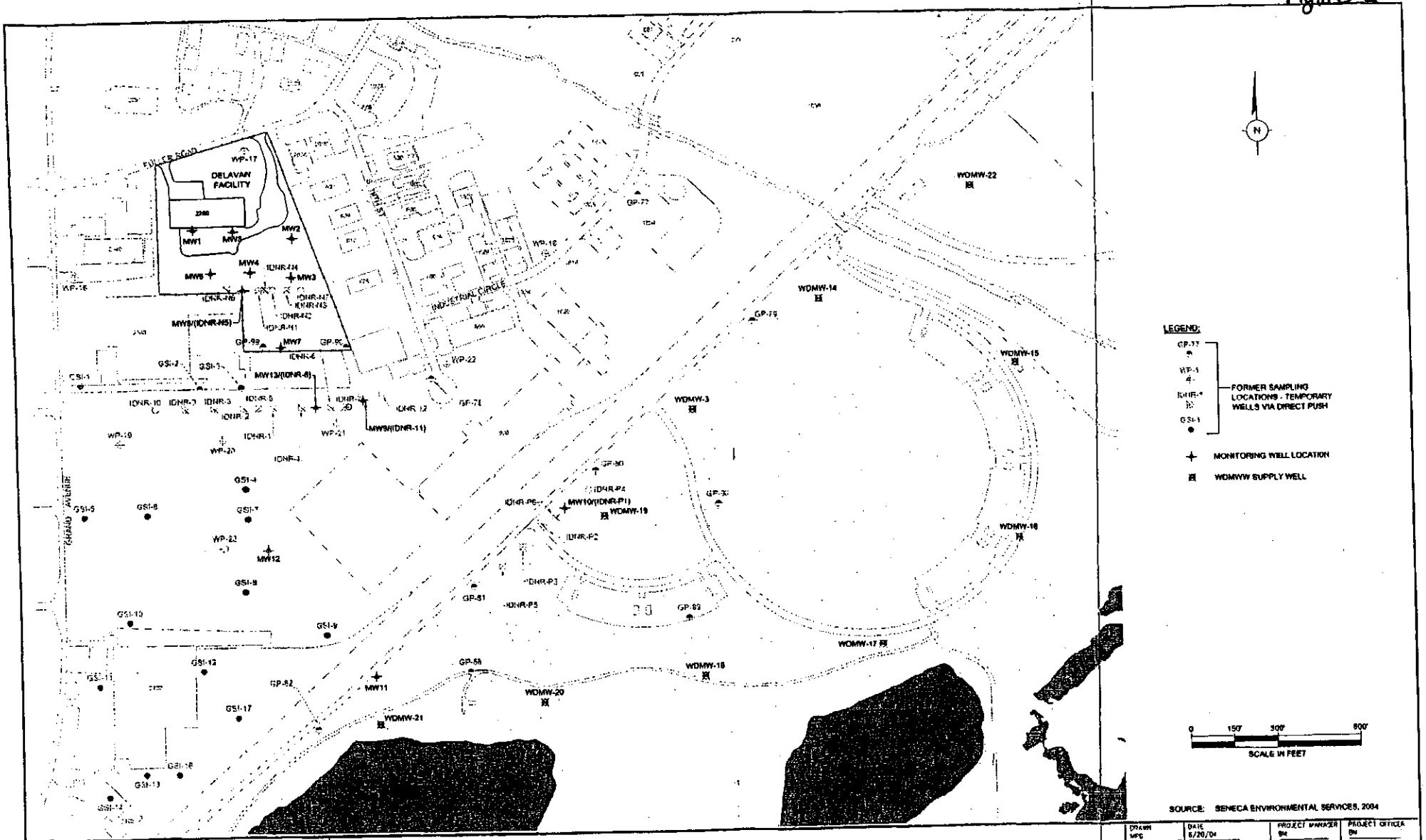
BLACK & VEATCH SPECIAL PROJECTS CORP.	FIGURE 1 SITE VICINITY MAP RAILROAD AVENUE GROUNDWATER CONTAMINATION SITE	REV 0

PLOTTER: HP 1055 PEN TABLE: r12-r14.stb PLOT SCALE: 1=1 Original dwg size: 8.5x 11 Revised By: mss02908 ON Apr 28, 2005 @ 1:34pm
Drawing: Z:\v8124\Phase 11\5\Proposed Plan Eastern Portion of North Plume\dwg\D0008619.DWG ACAD 15.05 Plot By: mss02908 Apr 28, 2005, 01:34pm Attached Xref:

Railroad Avenue Groundwater Contamination Site
Southern Plume

Record of Decision

Figure 2



SOURCE: SENECA ENVIRONMENTAL SERVICES, 2004

PROGRESSIVE ENGINEERING & CONSTRUCTION, INC.

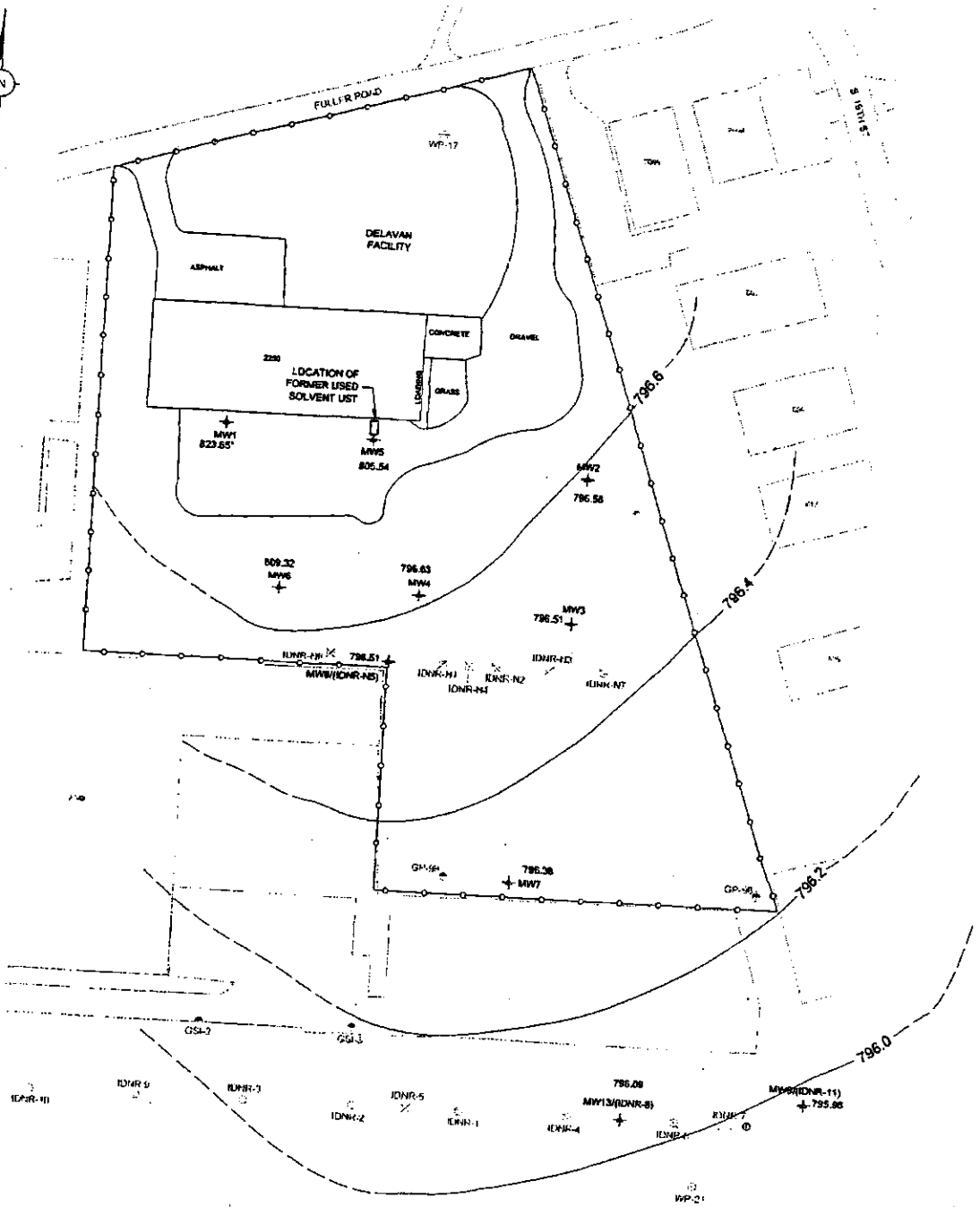
SOUTHERN PLUME SITE MAP
RAILROAD AVENUE SUPERFUND SITE
DELAVAN STEEL TREAT FACILITY
WEST DES MOINES, IOWA

DRAWN	DATE	PROJECT MANAGER	PROJECT OFFICER
MPG	6/30/04	BM	BM
REV.	DATE / DESCRIPTION	LEAD DESIGN PROF.	CHECKED
		BM	BM
CADD FILE NAME: Southern Plume Site Map.dwg		PROJECT NUMBER	FIGURE NUMBER
		P-1041	1

Railroad Avenue Groundwater Contamination Site
Southern Plume

Record of Decision

Railroad Avenue Groundwater Contamination Site - Southern Plume - Record of Decision



LEGEND:

- FORMER SAMPLING LOCATIONS - TEMPORARY WELLS VIA DIRECT PUSH
- MONITORING WELL LOCATION
- 796.2 WATER TABLE CONTOUR ELEVATION (DASHED WHERE INFERRED)
- 797.65 WATER LEVEL, MSL (* ANOMALOUS READING)

0 50' 100' 200'
SCALE IN FEET

SOURCE: SENECA ENVIRONMENTAL SERVICES, 2004

PROGRESSIVE ENGINEERING & CONSTRUCTION, INC.

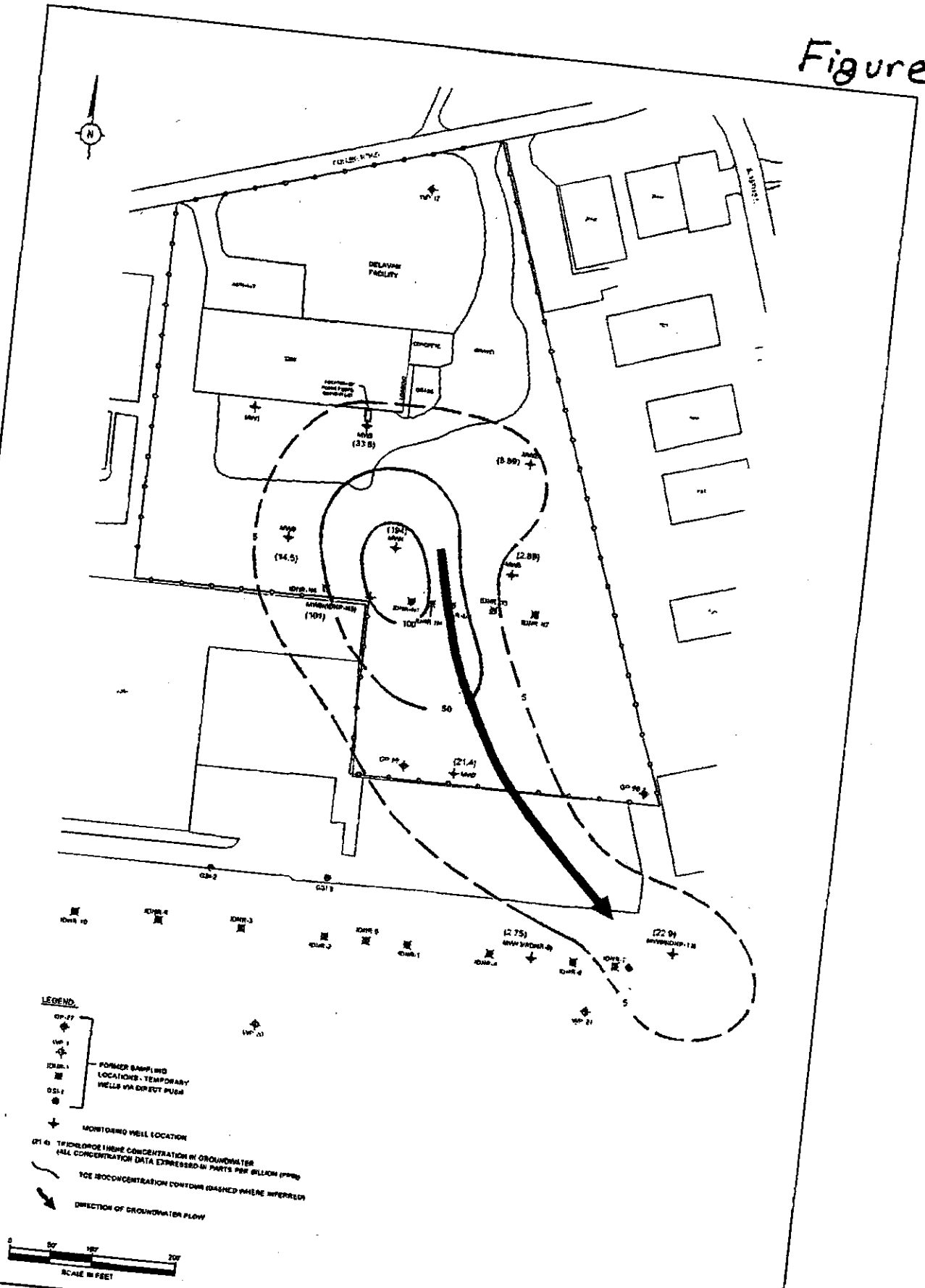
POTENTIOMETRIC SURFACE MAP
SHALLOW AQUIFER - JANUARY 15, 2004

DELAVAN STEEL TREAT FACILITY
WEST DES MOINES, IOWA

DRAWN MPC	DATE 8/30/04	PROJECT MANAGER BM	PROJECT OFFICER BM
REV. DPP	DATE 8/31/04	DESCRIPTION WL MAP 01/15/04	LEAD DESIGN PROF. BM
			CHECKED BM
CADD FILE NAME		PROJECT NUMBER P-1041	FIGURE NUMBER 7

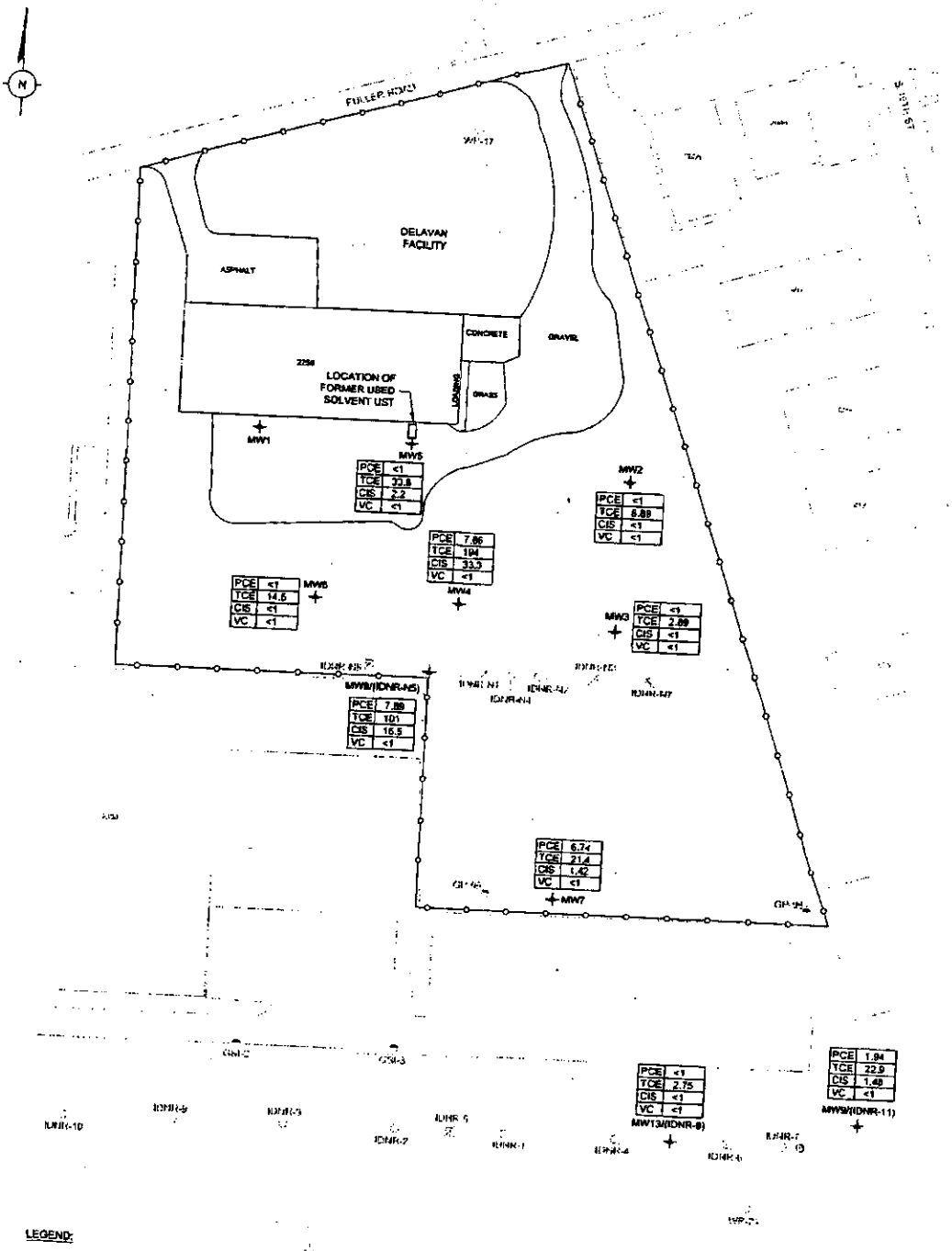
Figure 7

Figure 4



ad Avenue Groundwater Contamination
ern Plume

Railroad Avenue Groundwater Contamination Site – Southern Plume



LEGEND:

FORMER SAMPLING LOCATIONS - TEMPORARY WELLS VIA DIRECT PUSH

MONITORING WELL LOCATION

WATER QUALITY DATA - JANUARY 2004

PCE	6.74	=TETRACHLOROETHENE
TCE	21.4	=TRICHLOROETHENE
CIS	1.42	=CIS-1,2 DICHLOROETHENE
VC	<1	=VINYL CHLORIDE

ALL CONCENTRATION DATA EXPRESSED IN PARTS PER BILLION (PPB)

0 50' 100' 200'

SCALE IN FEET

SOURCE: SENECA ENVIRONMENTAL SERVICES, 2004

Record of Decision

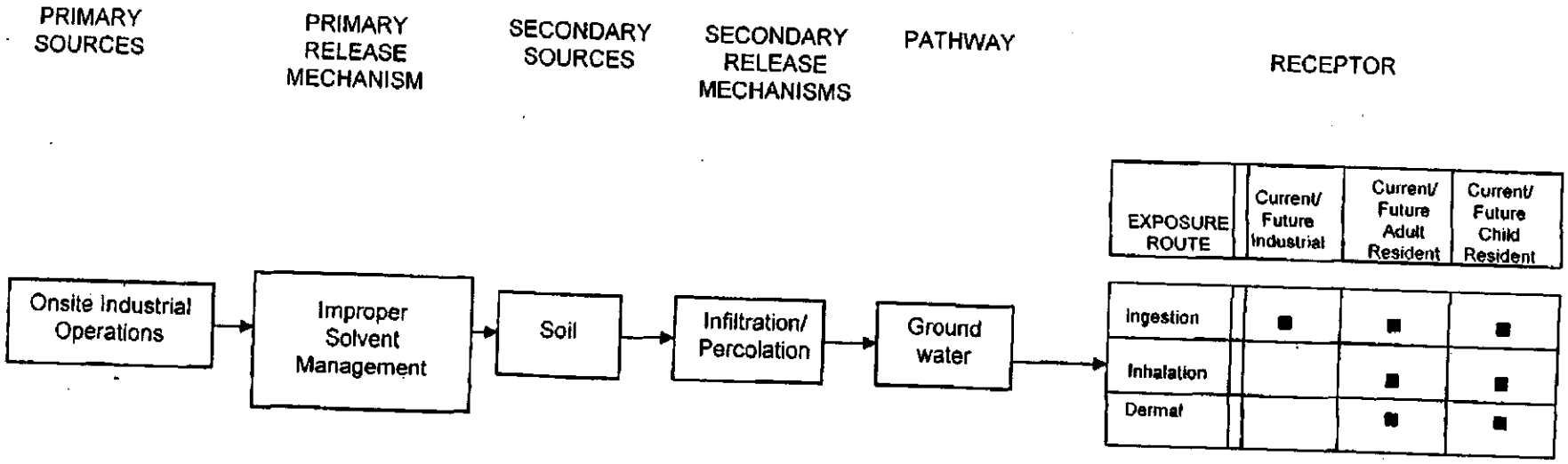
Figure 5

PROGRESSIVE ENGINEERING & CONSTRUCTION, INC.

SUMMARY OF WATER QUALITY FROM 2004 REMEDIAL INVESTIGATION

DELAVAN STEEL TREAT FACILITY
WEST DES MOINES, IOWA

DRAWN MPC	DATE 8/20/04	PROJECT MANAGER BM	PROJECT OFFICER BM
REV. DATE	DESCRIPTION	LEAD DESIGN PROF. BM	CHECKED BM
DPP 8/31/04	WO Map Jan04	PROJECT NUMBER P-1041	FIGURE NUMBER 1
CADD FILE NAME: Delavan Facility Site Map dwg			



■ This pathway is quantitatively evaluated.

Figure 6
Conceptual Site Model
Railroad Avenue Groundwater Contamination Site

APPENDIX B

STATEMENT OF WORK

FOR

COMPLETION OF THE REMEDIAL ACTION

AT THE

RAILROAD AVENUE GROUNDWATER CONTAMINATION SITE
OPERABLE UNIT 2 – SOUTHERN PLUME
WEST DES MOINES, POLK COUNTY, IOWA

March 2007

STATEMENT OF WORK FOR COMPLETION OF THE REMEDIAL ACTION AT THE RAILROAD AVENUE GROUNDWATER CONTAMINATION SITE OPERABLE UNIT 2 – SOUTHERN PLUME WEST DES MOINES, POLK COUNTY, IOWA

I. PURPOSE AND BACKGROUND

A. Purpose

This Statement of Work (SOW) sets forth the requirements for implementation of Work required by the Consent Decree (CD). The Work includes remedial activities selected in the Record of Decision (ROD) for the Railroad Avenue Groundwater Contamination Site Operable Unit 2-Southern Plume (Site), attached to the CD as Appendix A. The ROD for OU 2 was signed on September 11, 2006.

This SOW is incorporated into and made a part of the CD entered into by the Settling Defendant and the United States of America for the Work to be conducted at the Site. The Settling Defendant shall follow the ROD, the CD, and any Work Plans submitted in accordance with the CD or this SOW as approved by EPA in consultation with the Iowa Department of Natural Resources ("IDNR").

B. Background Information

The Environmental Protection Agency (EPA) conducted a Preliminary Assessment/Site Investigation (PA/SI) at the Site in October 1997 and an Expanded Site Inspection (ESI) in 1999. These investigations identified southern and northern plumes of dissolved contaminants at the Railroad Avenue Superfund site. The northern plume of dissolved chlorinated solvents, referred to as Operable Unit 1 (OU1), impacted the northern portion of the West Des Moines Water Works (WDMWW) well field (supply wells WDMWW-5, 6, 7, 12, and 13) and EPA has retained responsibility for the evaluation and remediation of that orphan plume. The southern plume of dissolved chlorinated solvents, referred to as OU2, impacted the WDMWW well field (supply wells WDMWW-19 and 21) and the Settling Defendant is responsible for evaluation and remediation of that plume

The origin of the southern plume was attributed to a former underground storage tank for waste trichloroethylene (TCE) at the Settling Defendant's facility located at 2250 Fuller Road, West Des Moines, Iowa. In May 2003, the Settling Defendant signed an Agreement on Consent (AOC) that required the performance of a removal site evaluation (RSE), a removal action, and the performance of a Remedial Investigation/Feasibility Study (RI/FS).

In June 2003, Settling Defendant initiated a RSE for its facility. The objectives of the evaluation were to evaluate potential response actions necessary to timely address releases of

chlorinated solvents from the facility and threats posed by the releases to water supply wells serving West Des Moines (WDM).

Based on the findings and determinations of the RSE and an Enforcement Action Memorandum approved September 26, 2003, Settling Defendant installed two aerators at the WDMWW to treat volatile organic contaminants in the groundwater extracted by municipal water supply wells affected by both the southern and northern plumes. The construction began on October 18, 2004, and was completed on December 10, 2004. The aerators are currently in operation and are maintained by WDMWW via a cooperative agreement with the EPA. Per the ROD, the aerators are the first interim response action and serve as a portion of the remedy for both OU1 and OU2 of this Superfund Site.

Pursuant to the performance of the RI/FS, Settling Defendant conducted additional groundwater investigations for OU2 in January 2004. The plume was found to contain TCE concentrations up to 194 micrograms per liter (μg/1) in the apparent source area (near MW-4) within Settling Defendant's facility. Additional sampling in November 2004 at two downgradient WDM water supply wells, WDMWW-19 and 21, showed TCE at 1 ug/1 and non-detect, respectively. The Safe Drinking Water Act maximum contaminant level (MCL) for TCE is 5 μg/1.

In March 2005, Settling Defendant prepared an addendum to the RSE that evaluated possible response actions to more timely address the source of the TCE contamination in OU2. The RSE addendum determined that air sparging would address the source of the contamination and prevent migration of the highest levels of contamination off site and thus significantly reduce contaminant movement toward WDM water supply wells downgradient of OU2. The selection of air sparging as an appropriate removal action was documented in an Enforcement Action Memorandum signed April 19, 2005. Construction of the air sparging system began in June 2005 and was completed in December 2005. Per the ROD, the air sparging system is the second interim response action, and is operated by Settling Defendant.

In addition to the completed tasks outlined above, the Settling Defendant previously completed the following documents which were approved by EPA and/or IDNR and are adequate for some aspects of the remaining Work under the Consent Decree and this SOW:

1) *Health and Safety Plan* (December 2003)
2) *Quality Assurance Project Plan* (December 2003)
3) *Field Sampling Plan* (December 2003)
4) *O&M Manual* (December 2005)

These documents shall be updated from time to time if applicable to meet the objectives of the ROD, and to comply with applicable Federal, State and Local requirements. The *Health and Safety Plan* shall apply to all site activities in which there is a reasonable probability of exposure to hazardous substances.

Other reference documents include:

- *Remedial Investigation/Feasibility Study Work Plan* and *Remedial Investigation Summary Report* (Seneca, dated 12/3/03 and 3/1/04, respectively)
- *Baseline Risk Assessment Addendum* (IDNR, dated May 2004)
- *Removal Site Evaluation Memorandum and associated Removal Action Work Plan* (Progressive, 8/15/03)
- *Feasibility Study and Remedial Design* (Progressive, dated 9/28/04)
- *Well Field Management Plan* (Progressive, dated October 2004)
- *Construction and Startup Summary for Railroad Avenue Superfund Site Southern Plume Removal Action (New Aerators at WDMWW) Memorandum* (Progressive, December 2004)
- *Removal Site Evaluation Memorandum Addendum* (Progressive, 3/2/05)
- *Annual Performance Monitoring Report* (Seneca, November 2006)

II. DESCRIPTION OF THE REMEDY

The major components of the remedy set forth in the ROD to address the Southern Plume of the Railroad Avenue Groundwater Contamination Site (OU2) are:

- Continued operation of the aerators at the WDMWW treatment plant to treat contaminated water that may reach the public water supply wells. This aspect of the selected remedy is not the responsibility of Settling Defendant; rather the responsibility of WDMWW under a cooperative agreement with EPA.

- Continued operation of the source area air sparging system to prevent off-site migration of contaminants above MCLs.

- Restoration of the aquifer by reduction of the contaminants of concern (COCs) through natural attenuation processes.

- Continued implementation of groundwater monitoring to evaluate effectiveness of the source area remedy and natural attenuation processes, and to ensure that the OU2 remedy remains protective of human health and the environment.

- Institutional controls including local or state well restrictions and public education to prevent use of contaminated groundwater.

Per the ROD, the selected remedy will permanently and significantly reduce the toxicity, mobility and volume of the site COCs through the interim response actions (i.e., the aerators at WDMWW, and air sparging at the source area) along with natural attenuation processes as the principal element of remediation.

III. CONTAMINANTS OF CONCERN AND PERFORMANCE STANDARDS

A. Contaminants of Concern

The ROD specifies the following contaminants of concern (COCs) in OU2 groundwater:

Contaminants of Concern
Tetrachloroethene (PCE)
Trichloroethene (TCE)
Cis-1,2 Dichloroethene (cDCE)
Trans-1,2 Dichloroethene (tDCE)
Vinyl Chloride

B. Performance Standards

The ROD specifies the following Remedial Action Objective (RAO) for OU2:

"Prevent ingestion of groundwater having concentrations of OU2 COCs in excess of current regulatory drinking water standards. The current regulatory drinking water standards for the COCs are the MCLs. The MCLs are the maximum permissible levels established by the Safe Drinking Water Act [40 Code of Federal Regulations (CFR) 141] for a contaminant in water that is delivered to any user of a public water system."

In order to achieve this RAO, the Performance Standards for the selected remedy for OU2 are as follows:

- The objective of the air sparging system interim response action is to treat groundwater COCs at the suspected source area for OU2, thereby preventing off-site migration of COCs at levels above MCLs. Since groundwater at the property boundary exceeded MCLs at the time of startup of the air sparging system, the performance objective is to achieve decreasing trends for all COCs at each well located at or beyond the Settling Defendant's property boundary, namely wells MW-7, 9,10,11,12,13 of the current groundwater monitoring program (as amended).

- The objective of the monitored natural attenuation portion of the OU2 remedy is to achieve the Performance Standards listed in Table 1. Achievement of the Performance Standards will reduce the excess cancer risk and non-cancer hazard level associated with exposure to groundwater to less than one in a million and below one, respectively.

Table 1

Performance Standards for Monitored Natural Attenuation Portion of OU2 Remedy Railroad Avenue Groundwater Contamination Site West Des Moines, Iowa	
COCs	**Performance Standard** (MCL, in µg/l)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5
Cis-1,2 Dichloroethene (cDCE)	70
Trans-1,2 Dichloroethene (tDCE)	100
Vinyl Chloride	2

IV. SCOPE OF WORK

A. Continued Operation, Maintenance, and Monitoring of Air Sparging System

The Settling Defendant shall continue to implement the air sparging system until it has been demonstrated that groundwater quality within the source area meets Performance Standards or contaminant reductions within the source area are asymptotic and source area contaminants have decreased to concentrations that are conducive to the continued degradation through natural attenuation to meet the Performance Standards. In such situations the Settling Defendant may shut down air sparging operations contingent upon EPA approval, in consultation with IDNR.

The Settling Defendant shall monitor the effectiveness of the air sparging system and document the restoration of the aquifer through natural attenuation by conducting semi-annual sampling of thirteen existing monitoring wells and the two downgradient WDM water supply wells, WMDWW-19 and 21. The ROD determined that this monitoring network and frequency was adequate, and is hereafter referred to as the "groundwater monitoring program."

The groundwater monitoring program includes analyses of groundwater quality and groundwater movement to ensure that the air sparging system remains effective and enhances the degradation of COCs sufficiently to allow the monitored natural attenuation component of this remedy to achieve Performance Standards. The groundwater monitoring program shall be amended, as appropriate, to include the parameters necessary to document natural attenuation processes are occurring. These parameters shall include, but not be limited to, total iron, sulfate, nitrate as nitrogen, sulfide, chloride, methane, ethane, ethane, and total organic carbon. The specific details of the groundwater monitoring program for air-sparging were outlined in the RSE addendum and associated Removal Action Work Plan, approved by EPA and IDNR, and include monitoring of all COCs listed in Table 1 of this SOW.

At a minimum, the air sparging system shall remain in operation for two years after startup; startup took place in November 2005. If the monitoring data yield inadequate information on the concentrations, movement, or degradation of COCs, or to assess the protectiveness and the effectiveness of the air sparging portion of the remedy or the progress of natural attenuation, the EPA in consultation with IDNR may require the installation of additional

groundwater monitoring wells and laboratory analysis of samples from such wells, and/or laboratory analysis of additional parameters. If any of the monitoring wells designated for sampling in the groundwater monitoring program, or subsequent revisions, are destroyed or in any way become unusable, the Settling Defendant shall notify EPA and IDNR and promptly repair or replace such well(s), unless deemed unnecessary by the EPA in consultation with IDNR.

The Settling Defendant shall provide the analytical results from each groundwater sampling event to the EPA and the IDNR within 90 days after receipt of laboratory results. The submittal shall include the raw analytical data, the data validation package, and a synopsis of the validated data, including summary tables. Copies of the raw analytical data and the data validation packages are not required to be submitted to the IDNR.

The Settling Defendant shall provide an Annual Progress Report, per Section IV.G. of this SOW, summarizing the tasks performed during the previous year and the results of the previous year's sampling and monitoring events, including tables and figures, to the EPA and the IDNR on an annual basis.

Based upon the results of monitoring, the Settling Defendant may, upon EPA approval in consultation with IDNR, reduce the sampling frequency and/or the number of sampling locations, or delete individual COCs from the sampling program. Justification for reducing the sample frequency or deleting COCs from the sampling program shall include a discussion of the rationale and the basis for the proposed modifications, and may be submitted in the Annual Progress Report.

B. Monitored Natural Attenuation

During the operation and following the approved shut down of the air sparing portion of the groundwater remedy, the Settling Defendant shall continue to implement the approved groundwater monitoring program described above to document the restoration of the aquifer through natural attenuation and to demonstrate that the remedy remains protective of human health and the environment. The results of the groundwater monitoring program should show that attenuation processes are sufficient to allow progress towards achieving the Performance Standards, and to confirm that once the Performance Standards are achieved they are maintained over the long-term. If applicable, Settling Defendant may utilize aquifer models to evaluate the rate of natural attenuation and the migration of COCs.

During the MNA period, which may take up to 20 years to achieve Performance Standards, Settling Defendant shall demonstrate that decreasing concentration trends exist for all COCs at each well located at or beyond the Settling Defendant's property boundary, namely wells MW-7, 9, 10, 11, 12, 13 of the current groundwater monitoring program, as amended based upon EPA and IDNR review of results provided in the Annual Progress Reports as discussed above. Settling Defendant shall continue sampling at least annually during the MNA portion of the remedy until the Performance Standards listed in Table 1 of this SOW are achieved at all points throughout the contaminated groundwater plume for a minimum period of three years, or until the Settling Defendant demonstrates, subject to the EPA's approval in

consultation with the IDNR, that COC concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis or that it is technically impractical to achieve one or more of the Performance Standards.

In the event the COC concentrations exhibit increasing trends, the Settling Defendant shall notify the EPA and the IDNR immediately and, within 21 days, shall propose a Contingency Plan to EPA, for approval in consultation with IDNR that will be implemented to assess and address the increasing trend. The Contingency Plan shall include a schedule for implementation and reporting.

If the monitoring data indicate that the groundwater monitoring program is inadequate in providing information on the concentrations, movement, or degradation of groundwater COCs, or to assess the protectiveness and the effectiveness of the MNA remedy, the EPA in consultation with IDNR may require the installation of additional groundwater monitoring wells and laboratory analysis of samples from such wells, and/or laboratory analysis of additional sampling parameters. If any of the monitoring wells designated for sampling in the groundwater monitoring program, or subsequent revisions, are destroyed or in any way become unusable, the Settling Defendant shall notify EPA and IDNR and promptly repair or replace such well(s), unless deemed unnecessary by the EPA in consultation with IDNR.

The Settling Defendant shall provide the analytical results from each groundwater sampling event to the EPA and the IDNR within 90 days after receipt of laboratory results. The submittal shall include the raw analytical data, the data validation package, and a synopsis of the validated data, including summary tables. Copies of the raw analytical data and the data validation packages are not required to be submitted to the IDNR.

The Settling Defendant shall provide an Annual Progress Report, per Section IV.G. of this SOW, summarizing the tasks performed during the previous year and the results of the previous year's sampling and monitoring events, including tables and figures, to the EPA and the IDNR on an annual basis.

Based upon the results of monitoring, the Settling Defendant may, upon EPA approval in consultation with IDNR, reduce the sampling frequency and/or the number of sampling locations, or delete individual COCs from the sampling program. Justification for reducing the sample frequency or deleting COCs from the sampling program shall include a discussion of the rationale and the basis for the proposed modifications, and may be submitted in the Annual Progress Report.

C. Institutional Controls

Upon request by EPA, the Settling Defendant shall prepare for EPA review and approval, a restrictive covenant or easement to be filed with the county as detailed in the Consent Decree.

In accordance with the Consent Decree, Settling Defendant shall provide the EPA and its representatives with access to property to which access is required as necessary to effectuate the Consent Decree and this SOW, including, but not limited to, areas where the installation,

monitoring, and sampling of groundwater monitoring wells will be performed. If the Settling Defendant does not own the property where access is needed, the Settling Defendant shall use best efforts to attain access for the purpose of performing the Remedial Action.

D. Contingency Plan

If applicable as described above, the Settling Defendant shall develop a Contingency Plan to respond to increasing and non-decreasing trends in COC concentrations at wells located at and beyond the source area property boundary. The type of information to be included in a Contingency Plan shall include, but may not be limited to, provisions for confirmation sampling; modifications to institutional controls; modifications to the groundwater monitoring program; and description of additional tests or data evaluation (e.g., groundwater modeling, risk assessment).

Implementation of the Contingency Plan shall be based on the data and information collected during the groundwater monitoring program. The final determination of the need for the implementation of any Contingency Plan provision shall be made by the EPA in consultation with IDNR.

E. Updated Groundwater Monitoring Plan and Quality Assurance Plan

Within 30 days of the effective date of the Consent Decree, Settling Defendant shall submit an updated Groundwater Monitoring Plan and Quality Assurance Plan to incorporate data collection activities for monitored natural attenuation. The updated plans must include new sampling parameters and analytical methods to interpret data obtained from monitoring points. The data obtained must support the Annual Progress Report discussions/opinions, as described in Section IV.G.

F. Remedial Action Report

Within 60 days after the Settling Defendant concludes that the Remedial Action has been fully performed and that the Performance Standards have been achieved, the Settling Defendant shall submit a draft Remedial Action Report. This report shall be prepared consistent with the EPA guidance entitled Close Out Procedures for National Priority List Sites, OSWER 9320.2-09A-P, January 2000 or as superseded by subsequent guidance. In the report, a Licensed Professional Engineer and the Settling Defendant's Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall contain the following statement, signed by a responsible corporate official of the Settling Defendant or the Settling Defendant's Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete, I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The Settling Defendant shall address the EPA's comments on the Remedial Action Report in accordance with the schedule identified in Section V of this SOW.

G. Annual Progress Reports

Settling Defendant shall submit Annual Progress Reports to the EPA and IDNR throughout duration of Work per the Consent Decree and SOW. Annual Progress Reports shall be submitted annually in November, or as otherwise directed by EPA and shall continue to be submitted until Settling Defendant submits the Remedial Action Report. Annual Progress Reports shall include, but need not be limited to the following:

- Description of activities performed during the reporting period;
- Summary of sampling results and tests obtained during the reporting period; including a map showing the estimated extent of the COC plume, and the location of existing and new (if applicable) wells associated with OU2
- Summary of deliverables submitted to EPA during the reporting period;
- Description of activities performed during the reporting period in support of community relations, if any;
- Description of activities performed per Contingency Plan provisions during the reporting period, if any, the basis for implementing the provisions and a summary of the outcome;
- Description of anticipated work to be performed during the next reporting period;
- Proposed modifications to work plans or schedules, if any.

The Annual Progress Report shall include an opinion regarding (1) the effectiveness of the Remedial Action (air sparging and/or MNA portions, as applicable for the subject reporting period); (2) the protectiveness of the remedy; and (3) the estimated timeframe until Performance Standards are achieved. Such opinions shall be based on the results of the current and historical monitoring data and trends.

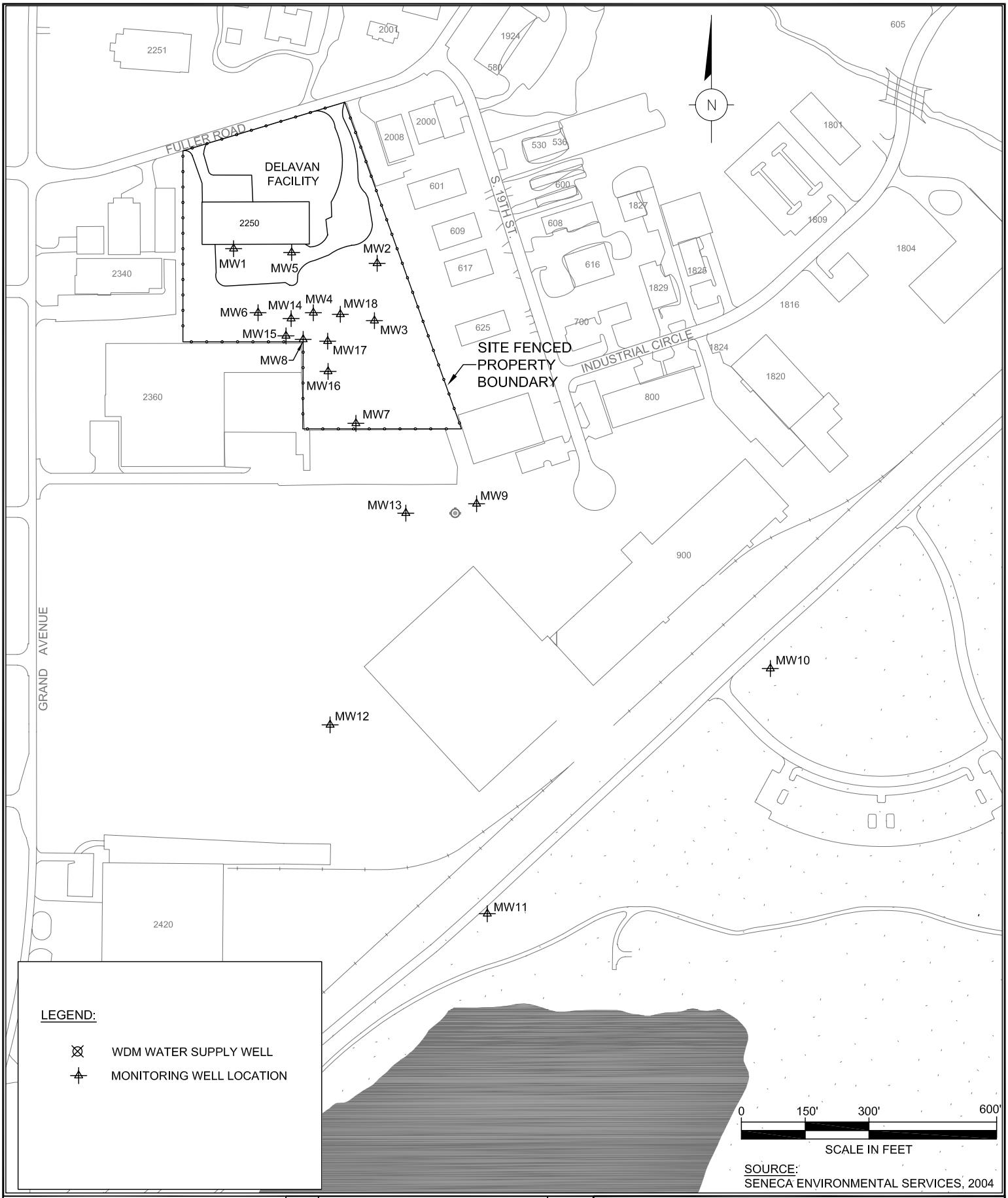
V. SCHEDULE OF MAJOR DELIVERABLES

A summary of the project schedule and reporting requirements contained in this SOW is presented as follows:

Submission or Activity	Due Date
Updated Groundwater Monitoring Plan	Due within 30 days of effective date of consent decree

Updated Quality Assurance Project Plan	Due within 30 days of effective date of consent decree
Groundwater Sampling Results	90 days after receipt of laboratory results for each sampling event
Annual Progress Reports	November each year, or as otherwise directed by EPA
Draft Remedial Action Report	60 days after Settling Defendant concludes that the Remedial Action has been fully performed and that the Performance Standards have been achieved
Final Remedial Action Report	Within 30 days of receiving comments from EPA on the Draft Remedial Action Report.

APPENDIX C



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NO.	REVISION DETAILS	DATE

RAILROAD AVENUE SITE
SOUTHERN PLUME OU2

DATE: 9/12/06

DRAWN: DPP

APPROVED: BSM

DRAWING NUMBER: 1

FILE PATH: PROJECTS\GOODRICH - Iowa\Drawings\2006\Southern Plume Site Map 2.dwg

SCALE: 1" = 300'